

PATENT SPECIFICATION

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(54) BRACING FORMING A RAILING FOR A WORKING LEVEL ON SCAFFOLDING

(71) We, SOMEFRAN S.A. Societe d'Exploitation des Brevets MEFRAN, of Chemin de la Gardie, 34510 Florensac, France, a French corporate body, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates generally to bracing forming a railing for a working level on scaffolding, and also to a process for the erection of scaffolding which by means of this bracing permits better protection of the workers doing the erection work.

It is in fact known that tubular scaffolding is erected one level at a time starting from the ground, and that erectors on a working level of the scaffolding which has already been erected must first proceed, from this working level, to place in position a floor above their head at a level substantially corresponding to the upper working level, whereupon they climb onto this floor, install a railing or provisional protective handrail at this upper level, and continue to erect the tubular scaffolding by repeating these operations from level to level.

Up to the present time therefore no solution has been found to the problem of protecting the erectors standing on a floor which is to form an upper working level, and from which they must proceed to erect the scaffolding, while they cannot place in position the permanent protective railings until the erection or installation of this working level has reached a certain stage. In other words, the erectors have absolutely no protection against falling when they climb onto a floor which is to form the next working level to be erected.

In order to solve this problem and to reduce still further the risk of accidents caused to workmen by falls, the invention proposes bracing forming a railing for a working level of a scaffolding, characterised in that it is supported by scaffolding uprights situated beneath the working level in

question so as to be movable between two respective upper and lower end positions, the bracing in its lower position being able to be attached to these uprights from a working level immediately below the working level in question and able, from this lower level, to be brought to and locked in its upper position, where it forms a railing for the working level in question.

It will be understood that from a lower working level which is already provided with protective and safety systems the bracing of the invention can be brought into an upper position where it forms a railing for the upper working level which is to be installed. Thus, the workers engaged on the erection and installation of this upper working level are protected against falling by a railing which was assembled and fixed in the desired position before the assembly of the upper working level, that is to say before the workmen can actually gain access to this upper working level.

The bracing of the invention thus makes it possible to eliminate the risks of falls which existed hitherto during the first stage of erection and preparation of an upper working level.

The invention also proposes a process for the erection of scaffolding which makes it possible to provide protection against falls for workmen working on the erection of the scaffolding and the placing in position of a working level from an immediately lower working level, characterized in that it consists in movably attaching protective bracing on vertical uprights of the scaffolding between the two working levels in question, and then moving this bracing from the lower working level to an upper position where it forms a railing corresponding to the upper working level, locking the bracing in this upper position, and then placing in position and installing the upper working level, and then continuing the erection and assembly of the scaffolding from this upper level.

The invention will be better understood,

and other objects, characteristics, details, and advantages of the invention will be seen more clearly in the course of the explanatory description which follows and which is given with reference to the accompanying diagrammatical drawings, the latter being given solely by way of example to illustrate three embodiments of the invention; in the drawings:

Figure 1 is a diagrammatical view in perspective of bracing according to a first embodiment of the invention, the bracing being in its lower position;

Figure 2 is a diagrammatical view in perspective showing the bracing of Figure 1 after it has been brought to its upper position;

Figures 3 and 4 are views corresponding to Figures 1 and 2 but illustrating a second form of construction of a bracing according to the invention; and

Figures 5 and 6 are views likewise corresponding to Figures 1 and 2 and illustrating a third form of construction of bracing according to the invention.

In Figures 1 and 2 there has therefore been shown diagrammatically a scaffolding in the course of erection, in which the working level has already been erected and installed and where the next higher working level N+1 is now to be erected and installed, this upper working level being shown in dash-dotted lines in Figure 2.

The working level N comprises a floor 10 which rests on horizontal bars 11 of vertical scaffolding elements, which will hereinafter be referred to as ladders, comprising vertical uprights 12 which are connected together from place to place by horizontal bars 11 and which are disposed transversely in the scaffolding. The erectors standing on the working level N are protected against falling out of the scaffolding by bracing 13 according to the invention, which forms a railing for this working level N which has already been placed in position, as will be explained below.

The workmen standing on the working level N fasten on the top end 14 of the outer vertical uprights 12 of the scaffolding a second bracing 13 according to the invention, as shown in Figure 1.

This bracing 13 comprises essentially two parallel up-rights 15 which are connected together at one end by a frame 16 provided with stays 17 and intended to form a railing.

Each upright 15 of the bracing 13 is mounted for pivoting on the end 14 of the aforesaid upright 12 of the scaffolding by means of a stirrup 18, which in turn is mounted for pivoting on the upright 15 of the bracing 13 and which is adapted to be locked in place on the upright 12 of the scaffolding by means of a key. At its two opposite ends each upright 15 also carries

two identical stirrups 18 which will enable the bracing 13 to be locked in its upper position, as will be explained below.

The bracing 13 intended to form a railing for the working level N+1 is therefore erected in the following manner:

The workmen who are standing on the level N, and who are already protected against falling by a first bracing 13 placed in position, fix the second bracing 13 on the upper part 14 of the aforesaid vertical uprights 12 by means of the intermediate stirrups 18 of each upright 15 of the bracing 13. In this position the bracing 13 which is to be installed is inverted, that is to say the frame 16 is at the bottom and the free ends of the uprights 15 are at the top, as illustrated in Figure 1. It is then sufficient to pivot the entire bracing 13 about the intermediate stirrups 18 of the uprights 15 which are fixed on the vertical uprights 12, the pivoting taking place for example in the direction of the arrows 20 shown in Figure 1. The second bracing 13 is brought into the position shown in Figure 2 and the stirrups 18 carried by the free ends of the uprights 15 of this bracing are locked on the vertical uprights 12.

The operation then continues in the conventional manner, comprising the installation of a working floor 21 shown diagrammatically in dash-dotted lines in Figure 2 and intended to form the working level N+1, whereupon the workmen climb onto this working level N+1, where they are protected against falling by the second bracing 13; they then erect further scaffolding by engaging further ladders 22 in the lower ladders, and they then lock the stirrups 18 carried by the end of the uprights 15 of the bracing 13 on the corresponding vertical uprights of these new ladders 22, near the frame 16 forming the railing.

The erection of the scaffolding then continues by repetition of the operations which have just been described.

In Figures 3 and 4 is shown an alternative form of construction of the bracing of the invention.

Like the preceding embodiment, the bracing 30 of this second embodiment comprises two parallel uprights 31 connected together at one end by a frame 32 provided with stays 33.

The free portion of each upright 31 forms with three articulated bars 34 a deformable parallelogram 35 in which the two opposite parallel bars 34 are pivotally fixed on the upper part 14 of the outer vertical upright 12 of the scaffolding by means of stirrups 36 provided with keys. In this way, and as illustrated in Figure 3, the uprights 31 of the bracing 30 and the bars 34 which are parallel and opposite to them are disposed sub-

stantially vertically, parallel to the uprights 12.

The erection and utilisation of this second form of construction of the bracing according to the invention takes place in the following manner.

The workmen standing on the working level N fix the parallelograms 35 of the bracing 30 on the upper part 14 of the outer vertical uprights 12, as shown in Figure 1, with the aid of stirrups 36 which can be locked by means of keys.

The bracing 30 then occupies the position shown in Figure 3, that is to say the frame 32 is in a lower position, slightly outside the scaffolding, while the deformable parallelogram 35 has been flattened and the bar 34 opposite the uprights 31 is situated at the very top of the parallelogram. It is then sufficient for the workmen to pull on these bars 34 opposite the uprights 31 of the bracing 30, as indicated by the arrows 37 in Figure 3, so as to deform the parallelograms 35, open them up, and flatten them again, before securing them against rotation on the corresponding uprights 12 of the scaffolding when the bracing 30 is in the position shown in Figure 4.

The bracing held in this position by the locking of the parallelograms on the uprights 12 forms a railing for the level N+1. When the floor 21 of this level N+1 and also the upper ladders 22 have been installed, the bracing 30 is locked on the vertical uprights of these ladders 22 by means of the stirrups 36 which can be fastened by keys and which are provided at the upper end of the uprights 31.

In the third embodiment illustrated in Figures 5 and 6 the bracing 40 comprises, as previously, two uprights 41 which are connected together at one end by a frame 42 provided with stays 44 and having at their other end two stirrups 43 adapted to be fastened by keys, spaced apart from one another, and intended for mounting on an outer vertical upright 12 of the scaffolding.

The workmen standing on the working level N mount the bracing 40 on the vertical uprights 12 of the scaffolding by means of the stirrups 43, as shown in Figure 5, these stirrups 43 not being completely locked on the uprights 12 and being able to slide along the latter in the direction indicated by the arrows 45 in Figure 5. The workmen thus raise the bracing 40 to the position shown in Figure 6 and the stirrups 43 are then fastened by keys and locked in position on the uprights 12. The floor 21 of the working level N+1 is then installed, the upper vertical ladders 22 are engaged in the preceding ladders, and the stirrups 43 which can be fastened by keys and which are provided at the ends of the uprights 41 of the bracing 40, near the frame 42, are locked on

the vertical uprights of these upper ladders 22.

It will easily be understood that the bracing according to the invention permits the protection of the erectors standing on the working level N+1 whose floor has just been installed, even before the upper ladders 22 have been installed and before a provisional protective railing can be placed in position between these upper ladders 22.

It is moreover quite clear that many other forms of construction of the bracing according to the invention are possible without departing from the scope of the present invention.

It is therefore clearly understood that the invention is in no way limited to the embodiments described and illustrated, which were given only by way of example.

WHAT WE CLAIM IS:—

1. Bracing forming a railing for a scaffolding working level, characterized in that it is supported on scaffolding uprights situated under the working level in question so as to be movable between two respective upper and lower end positions, while in its lower position the bracing can be attached to the said uprights from a working level immediately below the working level in question and from the said lower level can be brought to and locked in its upper position where it forms a railing for the working level in question.

2. Bracing according to Claim 1, characterized in that it is mounted for sliding on the aforesaid vertical uprights of the scaffolding between the two aforesaid working levels.

3. Bracing according to Claim 1, characterized in that it is mounted for pivoting about horizontal axes on the aforesaid uprights and passes from its lower position to its upper position by rotation through about 180°.

4. Bracing according to Claim 1, characterized in that it is supported by two deformable parallelograms mounted pivotally on the aforesaid uprights, the deformation of these parallelograms effecting the displacement of the bracing between its lower and upper positions.

5. Bracing according to one of the preceding Claims, characterized in that it comprises two parallel uprights connected together at one end by a frame provided with stays and forming the aforesaid railing.

6. Bracing according to Claim 5, characterized in that the other end of each upright of the bracing is mounted for sliding at two points spaced apart on a vertical upright of the scaffolding and can be locked at these two points on the said upright.

7. Bracing according to Claim 5, characterized in that each of the aforesaid uprights

is mounted on a vertical upright of the scaffolding for pivoting at an intermediate point about a horizontal axis.

- 5 8. Bracing according to Claim 5, characterized in that near its free end each of its uprights forms together with three articulated bars the aforesaid deformable parallelogram in which the two opposite parallel bars are mounted for pivoting at a
10 substantially median point on a vertical upright of the scaffolding.

9. Bracing according to one of the preceding Claims, characterized in that it comprises means of locking in the upper
15 position, for example by keys, on the corresponding vertical uprights of the scaffolding, on each side of the working level in question.

- 20 10. A process for the erection of scaffolding permitting protection against falling of the workmen engaged on the erection of the scaffolding and on the placing in position of a working level from an immediately lower working level, characterized in that it consists in movably attaching protective bracing on the vertical
25 uprights of the scaffolding between the two

working levels in question, then moving this bracing from the lower working level into an upper position in which it forms a railing
30 corresponding to the upper working level, locking the bracing in its upper position, and then placing in position and installing the upper working level, and continuing the
35 erection of the scaffolding from the said upper level.

11. A process according to Claim 10, characterized in that it consists in moving the bracing to its upper position by pivoting
40 about horizontal axes on vertical uprights of the scaffolding, by sliding along the said uprights, or else by means of lever arms carrying the bracing and articulated on the said vertical uprights.

12. Bracing substantially as shown in Figs. 1 and 2, Figs. 3 and 4 or Figs. 5 and 6 of the
45 accompanying drawings and described herein with reference thereto.

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Sheet 1

Fig. 1.

Fig. 3.

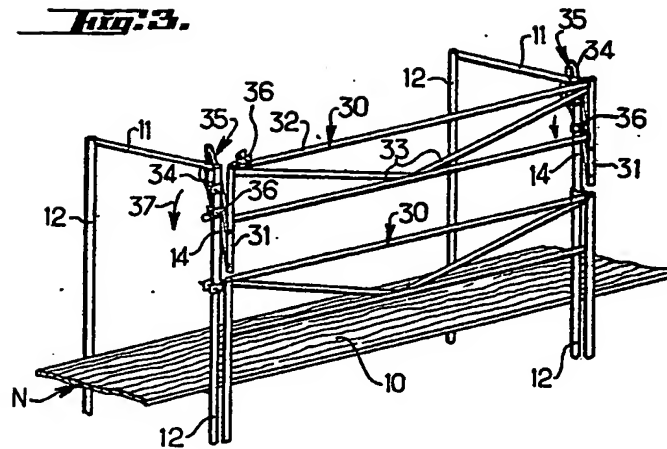
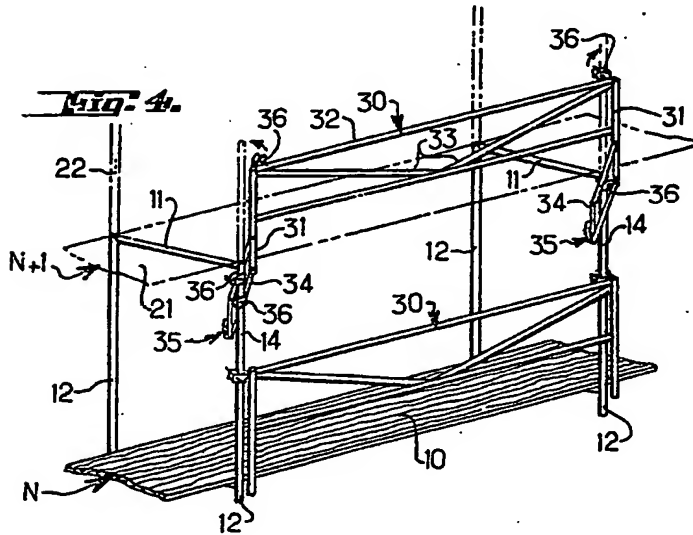


Fig. 4.



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3 SHEETS

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Sheet 3

